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Diagnosis and Treatment of Gas Gangrene

Certain current problems are contributing to critical delays in the diagnosis of gas gangrene and limitations of its treatment. As a result, this infection continues to be one of the most dreaded complications of wounds of violence with its rapid and fulminating course, profound toxemia, mutilating effects, and high mortality.

The infrequency of the occurrence of gas gangrene in civilian surgical practice has added to the difficulty. Although recent studies of the bacterial flora of accidental and war wounds have shown the presence of clostridial contamination to be 3.8% to 88.0%, depending upon the type of wound, the incidence of clinical gas gangrene has been relatively infrequent. In a compiled series of 187,936 major open wounds, the average incidence of gas gangrene was 1.76%, varying between 0.3% and 5.26%. Because surgeons are confronted with this condition so infrequently, they are often unfamiliar with the early signs and symptoms and do not anticipate its development in accidental wounds or wounds of violence.

The fact is emphasized that this disease is usually recognized by the clinical appearance of the patient and his lesion in its more obvious, far-advanced, and often irreversible stages. The presence of casts, splints, or large dressings necessary for the treatment of the major injury obscures the area of the wound and makes the observation and interpretation of local signs difficult and indirect. For these reasons, it is important to remove dressings promptly and to inspect the wound directly in the presence of the early symptoms of this infection. A high index of suspicion should always be held in patients with severe wounds associated with laceration or crushing of muscle.

Difficulties in recognizing gas gangrene seem to stem largely from two factors: confusion as to the nature and types of gas gangrene and the belief that this infection is associated with the development of the usual signs of pyogenic inflammation with extending redness of the skin, cellulitis, lymphangitis, purulent exudation, high fever, high leukocytosis, and frequent septicemia.

The most important causative microorganism is Clostridium welchii which was present in all but three of the 42 cases in this series, either alone or in combination with other Clostridia which include C. novyi, C. sporogenes, and C. sordelli.

A review of the cases emphasized the importance of the following points in recognizing gas gangrene.

1. A variable interval existed between injury and the development of the lesion which was as short as 6 hours, particularly in wounds associated with gross devitalization and contamination of muscle. The average incubation period, however, was 53 hours.
2. Pain was the earliest and most important symptom, being secondary to the rapid infiltration of the infected muscle by edema and gas. It

generally persisted after primary treatment of the wound and gradually increased thereafter.

3. Rapidity and feebleness of the pulse usually followed the onset of pain and were characteristically out of all proportion to the elevation of the temperature. In advanced or progressive lesions, the changes in the pulse became increasingly apparent and progressed to circulatory collapse which was abrupt, progressive, or severe. The average pulse rate at the time of diagnosis was 118; the extremes were 100 to 160.

4. Early, the blood pressure was normal or slightly elevated. Later, it became significantly lowered, falling precipitously in some instances to 40 mm. Hg or less.

5. Temperature elevation in the early stages of this infection varied considerably, the average being 101°F. The lowest temperature was 97°F. and the highest was 107°F. Fever was not, therefore, a reliable index of the severity and extent of the infectious progress. Low or subnormal temperature associated with a markedly rapid pulse indicated a grave prognosis.

6. The general appearance of the patient was also of some significance early in the course of the disease. Usually, he developed a peculiar grayish pallor, weakness, and profuse sweating. The usual malar flush associated with pyogenic infections was replaced by a striking pallor.

7. The mental state was often one of apathy and indifference, the patient being conscious and usually unaware of the seriousness of his condition. Stupor, delirium, prostration, and coma were late symptoms of overwhelming infection.

8. Gastrointestinal symptoms were usually not marked, anorexia being a fairly constant finding, but vomiting was uncommon.

9. The appearance of the local lesion was not that of a pyogenic inflammation. Early, the overlying skin was either white shiny and tense or essentially normal in appearance. An irritating brownish watery discharge with a peculiar foul odor usually escaped from the wound. As swelling increased, the overlying skin became dusky and bronze or khaki color. In advanced cases, further discoloration occurred and vesicles filled with dark red fluid appeared on the cutaneous surface and later coalesced. The color changes of the skin appeared earlier in more superficial and confined types than in deep and highly invasive types. Crepitation was palpable in 38 of 42 cases as a relatively late sign. Underlying muscle was usually discolored, edematous, and nonviable; it frequently herniated through a fasciotomy incision. The temperature of the extremity distal to the infected wound was reduced; in advanced lesions, the skin was cold to the touch.

There are no satisfactory laboratory tests for the early diagnosis of gas gangrene and it must be kept in mind that valuable time may be lost in awaiting results of various diagnostic tests. Rapid spread of the infection occurs within periods of 2 to 4 hours, and irreversible changes develop rapidly in the tissues.

Films taken at intervals of from 2 to 4 hours may aid in the differentiation of gas in the soft tissues produced by clostridial invasion from that due to mechanical or chemical causes. They have been of practical value in the detection of early or incipient gas gangrene permitting, in the authors' experience, a positive diagnosis 24 hours or more earlier than that possible by the clinical findings alone. If the visible gas increases in amount or presents a linear spread along the muscle and fascial planes, an early diagnosis of gas gangrene can be made. In far-advanced cases, large quantities of gas can be visualized in the muscular tissues by x-ray examination.

Crepitation in tissues about a wound occasionally is not produced by bacteria. Cases in which air has been sucked into the tissues by penetrating or perforating missiles have occasionally been confused with true gas gangrene. In other instances, the irrigation of wound tracts with hydrogen peroxide or benzene has caused the development of gas bubbles in tissues which results in subcutaneous crepitation or the visualization of these bubbles on x-ray films.

The principal problem in the treatment of established gas gangrene arises from delay in the recognition of this condition. The rapid spreading nature of this infection may cause an irreversible process to develop within a relatively few hours and a delay of 24 or more hours may cause death.

Delay in operative treatment is frequently an important factor, resulting either from the surgeon's indifference to the rapid spreading nature of this infection or from his inability to obtain the operating room facilities otherwise occupied at that time. Recently, a delay of 3 hours occurred during the admission of a patient with gas gangrene of the shoulder girdle. Extensive spread, overwhelming infection, and death occurred during this period.

From an analysis of these cases and other available information, the effective methods for the treatment of established clostridial myositis or true gas gangrene may be summarized as follows:

1. Radical operative treatment as soon after diagnosis as possible consisting of multiple incisions and fasciotomy for decompression and drainage of the fascial compartments, excision of the involved muscles, or open amputation when necessary.
2. Adequate immobilization of the affected part.
3. Injection of penicillin intravenously in large doses of 1,000,000 units or more every 3 hours before and after operative treatment.
4. The use of one of the tetracyclines, chlortetracycline, or oxytetracycline preferably in doses of 500 mg. administered intravenously every 4 to 6 hours.
5. Administration of polyvalent gas gangrene antitoxin before and after surgery, 50,000 units being given every 4 to 6 hours for 24 to 48 hours in patients with profound toxemia and hypotension.

6. Adequate supportive therapy.

7. A delay in performing secondary operative procedures to facilitate healing or to restore function of the wounded extremity until the infection has been brought completely under control.

(Altemeier, W.A., et al., Problems in the Diagnosis and Treatment of Gas Gangrene: Arch. Surg., 74: 839-845, June 1957)

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Lobectomy for Pulmonary Tuberculosis

This article reports a group of 301 cases of lobectomy for pulmonary tuberculosis. One-half of this group have been followed for 1 to 5 years. The immediate and late results are given with special reference to the lung function after lobectomies with different space diminishing procedures.

In this group, even patients with a very bad pulmonary function have been accepted. Of the 301 patients, 10 are dead and 163 have been followed. Ninety-one patients were excluded as the observation time was less than 1 year. Twenty-three patients have refused follow-up tests mainly because they did not like to have another bronchspirometry. Fourteen patients have not been traced. Only patients with lobectomies are included except in 39 cases of the 301 in which a wedge resection was added to the lobectomy. All patients with segmental resections will be reported later.

Nearly one-half of the patients, i. e., 48.5%, had bilateral pulmonary tuberculosis. Twenty-seven patients had an open cavity in the contralateral lung. In more than one-half of the material, 54.5% (164 cases) it was necessary to do an extrapleural resection or a decortication.

Old age in itself is not a contraindication to the removal of a lobe with cavitary tuberculosis. Due to emphysema and fibrosis of the remaining lung, it will often be found necessary to add an osteoplastic thoracoplasty at the same operation. Five patients in this material were operated upon at an age above 60 years. In all 5 cases, a lobectomy with simultaneous osteoplastic thoracoplasty was carried out. Four patients withstood the procedure very well. The fifth patient, a 64-year old man died from circulatory insufficiency two days after the operation.

In old patients with some coronary insufficiency, the postoperative course must be especially carefully supervised. Some atelectasis with shunting of blood and a decrease of the arterial oxygen tension must be prevented. If electrocardiography shows some signs of a coronary insufficiency, the author believes that a tracheostomy with prolonged artificial ventilation may save the patient from death in circulatory insufficiency.

Seven patients under the age of 20 were operated on, the youngest being a 15-year old patient who had a left lower lobectomy with a tailoring thoracoplasty (removal of posterior segments of ribs 2 to 8).

Indications for Lobectomy

1. Tuberculous Cavitation. The most common indication for the lobectomy has been cavitory tuberculosis in 85%, or 255 cases. The right upper lobe was the most common localization, i. e., 59% compared to 26% left upper lobectomies for cavitation.

In comparatively few cases, a lower lobe cavity was the indication for a resection, i. e., 28 cases, or 11%, on the right side and 11 cases, or 4%, on the left side.

No case of isolated cavitory tuberculosis existed in the middle lobe. However, in 22 cases, or 8%, the middle lobe was resected for cavitory tuberculosis; in 14 cases, or 5%, in combination with the upper lobe; and in 8 cases, or 3%, in combination with the lower lobe.

2. Bronchial Stenosis. Bronchial stenosis was the indication for resection in 26 patients, i. e., 9% of the material. This stenosis was localized to the right main bronchus in 2 cases, to the left main bronchus in 3 cases, and in all 5 patients, the upper lobe bronchus was also stenosed.

3. Bronchiectasis. Bronchiectasis with positive sputum was the indication for resection in 6 patients, or 2%, (2 right upper, 1 left upper, and 3 in the right middle and lower lobes).

4. Tuberculous Pneumonia. Tuberculous pneumonia was the indication for resection in 6 cases, or 2%. The right upper lobe was involved in 4 cases, the right lower lobe in 1 case, and the left upper lobe in 1 case.

5. Tuberculous Empyema with Bronchial Fistula. In 7 cases, a tuberculous empyema with bronchial fistula was the indication for resection. Two of these fistulas were caused by an extrapleural plomb of plastic material (Polystan).

6. Secondary Infected Congenital Cyst.

An analysis is made of 301 cases of lobectomies for tuberculosis. Although patients with ventilatory insufficiency were accepted for surgery, the operative mortality was only 2.3%. Of the 163 patients followed from 1 to 5 years, it has been gratifying to find 98% with a negative direct smear and 85% with a negative culture and guinea pig test to sputum and gastric washing. Seventy-nine percent were working full time. The incidence of impaired arm movements, pain, cough, and dyspnea are recorded. The osteoplastic thoracoplasty gave a much better cosmetic result and better arm movements as compared to a thoracoplasty with rib resection. There was, however, a higher incidence of postoperative pain, i. e., 20% instead of 13% in the group who had rib resection. The late functional result has been very good after resection with a space-diminishing procedure. There was usually no significant decrease of the oxygen uptake or ventilation on the operated side after a resection although there was a significant decrease of the maximal breathing capacity. The contralateral side has withstood

the resection very well. (Björk, V.O., lobectomy for Pulmonary Tuberculosis: J. Thoracic Surg., 33: 754-769, June 1957)

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Aspiration Biopsy of the Parietal Pleura

The presence of free fluid in the pleural cavity is not infrequently associated with considerable diagnostic difficulty from the etiologic viewpoint. When the effusion is accompanied by obvious disease processes in the lung or in other organs, the etiology is more readily apparent. However, all too often the effusion is the primary feature of an illness and after utilizing all available diagnostic methods, including chemical, cytologic, and bacteriologic analysis of the fluid, no obvious cause is discernible.

A great need exists for a simple safe and effective technique for definitely establishing the etiology of pleural effusion. Current diagnostic methods often fail and one must rely on assumptions and observation for guidance. Unfortunately, assumptions may prove erroneous and protracted observation may increase morbidity and even mortality. The incidence of success in isolating tubercle bacilli from tuberculous pleural effusion varies from laboratory to laboratory and with the technique of examination. In general, tubercle bacilli can be cultured from about 25% of tuberculous pleural effusions. This usually requires many weeks and such a delay, coupled with the low incidence of positive results, makes this type of examination rather impractical. Yet tuberculosis is the main problem in this matter of pleural effusion because this diagnosis—so often presumptive—carries such serious therapeutic, economic, and prognostic implications.

Cytologic study of pleural fluid is helpful and produces positive results in about 50% of cases of malignant effusions when the examination is performed expertly. However, when the clear fluid does not reveal malignant cells, a mistaken diagnosis of tuberculosis is not infrequently made. In addition, false positive diagnoses occur because of the confusion resulting from the similarity between malignant and mesothelial cells, especially when the latter is in the process of dividing and possesses mitotic figures.

Furthermore, although certain characteristics of pleural fluid are usually present in specific conditions, there is an overlap which makes full reliance on the features of the fluid dangerous. This holds true for determinations of specific gravity, total and differential white cell count, erythrocyte count, protein, and sugar. Admittedly, certain clues may be forthcoming from these studies, but they do not permit a precise diagnosis.

Aspiration biopsy of the parietal pleura has provided a simple and accurate method for determining the etiology of most pleural effusions. It is as easy to perform as a thoracentesis and as free of complications. One of the most desirable aspects of this form of biopsy is that it can be executed

at the time of thoracentesis and usually provides a pathologic diagnosis within 24 to 48 hours. In 14 patients with tuberculous pleural effusion, aspiration pleural biopsy was the first proof of the cause and was available in most instances before the first 24-hour sputum specimen had been received in the laboratory. Similarly, in the carcinoma group, it was often the quickest method of diagnosis and in more than 50% of cases, provided the only tissue diagnosis.

The accuracy of aspiration pleural biopsy is attested by confirmation of the diagnosis by other means, including clinical course, bacteriologic proof, and histopathologic findings in other tissues including those obtained at necropsy. In this series, the diagnosis of tuberculous pleuritis or malignancy made on pleural biopsy was corroborated in every case.

It must be emphasized that nonspecific inflammatory changes of the pleura should not be accepted as a specific diagnosis because this may lead to errors. This is readily apparent when one realizes that the aspirated tissue containing parietal pleura may not be representative of the entire pleura. This situation obtains frequently in metastatic malignant involvement of the pleura in which islands of malignant tissue occur. Obviously, the aspirated parietal pleura may not be among areas of malignant invasion. In tuberculous pleural effusion, the pleura is usually diffusely studded with tubercles and, therefore, positive tissue is obtained at any site of aspiration. Occasionally, however, the pleura reveals granulomatous formation only in the region of the subjacent pulmonary tuberculous lesion while the remainder of the pleura shows a nonspecific pleuritis.

The finding of nonspecific pleuritis often indicates the need for open surgical pleural biopsy for precise diagnosis. Open surgical pleural biopsy was performed in 10 of 13 patients in whom nonspecific inflammatory changes were noted on aspiration biopsy. In 5 patients, granulomatous pleuritis was noted; in 2, carcinomatous tissue was obtained. The remaining 3 patients showed nonspecific pleuritis even after a complete exploratory thoracotomy. Precise implications of this finding remain to be elucidated. Careful follow-up examination may clarify this problem. It is entirely possible—although admittedly conjectural—that these cases are examples of an entity, benign nonspecific pleuritis which is not unlike its pericardial counterpart, benign nonspecific pericarditis. That some are expressions of lupus erythematosus cannot be denied.

The incidence of failure to obtain an adequate specimen is directly proportional to the experience of the person performing the biopsy. Most present failures occurred early in the study. The authors found it desirable to obtain several bits of tissue through the same initial needle puncture while varying the direction of the biopsy needle. This not only increases the likelihood of obtaining pleura, but has the added advantage of decreasing the incidence of false negative reports when the pleura is not diffusely involved. Currently, open pleural biopsy is resorted to only when at least three aspirated pleural

specimens have been examined and do not yield a specific tissue diagnosis. (Donohoe, R. F., Katz, S., Matthews, M. J., Aspiration Biopsy of the Parietal Pleura: Am. J. Med., XXII: 883-893, June 1957)

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Clinical Manifestations of Hypopotassemia

Patients with abnormally low concentrations of plasma potassium (hypopotassemia) may have numerous functional derangements. However, the majority of signs and symptoms attributed to hypopotassemia are non-specific, being found in many severely ill persons without low potassium levels. Moreover, multiple disturbances of homeostasis nearly always complicate potassium deficiency and may obscure or modify its effects. Therefore, the association of a given clinical abnormality with hypopotassemia does not necessarily indicate that the abnormality is caused by hypopotassemia per se. The frequency of different signs and symptoms occurring in hypopotassemia had not heretofore been investigated systematically in relation to the plasma potassium level. Such an investigation forms the basis of this report which was carried out on a fairly large patient material and includes a study of electrolytes other than potassium as well as an examination of the hypopotassemic patients before and after potassium administration.

During this study, the mortality of patients with hypopotassemia greatly exceeded the total hospital fatality rate. As indicated in an accompanying table, this also was true for each of the individual services. The patients who were studied consisted of 20 males and 30 females, aged 18 to 85 years. The list of diseases in these patients was headed by hepatic cirrhosis (10 patients, 6 of whom were in hepatic coma).

In nearly every case, several factors could have been responsible for the hypopotassemia. There was an average of nearly three etiologic factors per case; only one patient had but a single factor. These factors occurred with the following frequency: inadequate diet, 84%; infusion of potassium-free solutions, 52%; vomiting, 46%; suction and gastrointestinal fistulas, 24%; diarrhea, 24%; renal disease, 20%; administration of steroids, 10%; prolonged treatment with diuretics, 8%, and; insulin administration, 2%.

Hypopotassemia was found in about one-fifth of Philadelphia General Hospital inpatients in whom this measurement was made. A similar incidence has been reported from other hospitals. (Martin et al., and Patton et al).

The list of diseases diagnosed in these patients is long. The fact that 20% of the subjects had liver cell failure emphasizes the frequent association of the latter with hypopotassemia (Artman and Wise).

Inadequate potassium intake was of etiologic importance in nearly every case, although in most patients several factors were involved. The etiology

of hypopotassemia in 150 patients reported by Martin et al was similar. The correlation between hypopotassemia and hypochloremia was not surprising, nor was the common occurrence of alkalosis. However, the incidence of hypocalcemia was surprisingly high and the authors were not able to determine whether the correlation between the severity of hypopotassemia and hypocalcemia was fortuitous.

Although hypocalcemia was common, clinical manifestations were rare and in no case did tetany occur during potassium administration as may happen when potassium is given in the presence of hypocalcemia (Engle and Martin).

Clinical manifestations of hypopotassemia is discussed in relation to: (1) frequency of occurrence, (2) correlation with the severity of hypopotassemia, and (3) specificity.

During a 7-months' study, 557 cases of hypopotassemia were encountered in 2786 potassium determinations. The incidence among females was significantly higher than among males. The mortality of hypopotassemic patients was strikingly higher than the over all hospital fatality rate.

Fifty hypopotassemic patients were selected for detailed evaluation. Several etiologic factors which could have been responsible for hypopotassemia were present in nearly every case. Hypochloremic alkalosis with hypocalcemia commonly accompanied potassium deficit. Patients with the lowest plasma potassium levels had also lowest plasma calcium and chloride levels and were more alkalotic.

Clinical abnormalities were of the type often encountered in seriously ill patients with or without hypopotassemia. Of all clinical abnormalities, only decrease of the activity of the deep tendon reflexes showed some correlation with decrease in plasma potassium level. Rapid infusion of potassium was used as a method of suggesting which of the signs and symptoms found on initial examination might have been due to potassium deficiency. The most significant changes accompanying infusion were improved mental status and increased peristaltic activity. Further changes observed after several days of potassium repletion were difficult to evaluate for many other therapeutic procedures also had been carried out. The nonspecific nature of the clinical manifestations of hypopotassemia in this seriously ill, mentally clouded group of patients emphasizes the importance of electrocardiographic and other laboratory aids in the diagnosis of this disorder.

(Surawicz, B., et al., Clinical Manifestations of Hypopotassemia: Am. J. Med. Sci., 233: 603 615, June 1957)

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Atrial Fibrillation Following Mitral Valvulotomy

The commonest postoperative complication following mitral valve surgery in patients with a normal sinus rhythm is the occurrence of atrial fibrillation. This may appear in 24 to 38% of such patients. Although, in a majority of cases, sinus rhythm may be reestablished either spontaneously or with the aid of quinidine, a small percentage of patients will continue to fibrillate permanently following surgery. The records of 144 patients subjected to mitral valvulotomy were reviewed in order to examine the following features of postoperative atrial fibrillation:

1. Clinical characteristics
2. Predisposing factors
3. Effect of digitalis and quinidine

The high incidence of atrial fibrillation following mitral valvulotomy indicates the importance of mitral stenosis and associated atrial disturbance as factors in the production of the arrhythmia. Atrial fibrillation is an uncommon postoperative complication in patients who do not have rheumatic heart disease. In 64 consecutive thoracotomies performed at the Stanford University Hospitals for pulmonary resections in patients without rheumatic heart disease, there was only one patient (1.6%) who developed auricular fibrillation following surgery. Other authors have reported incidences of 3.5%, 6.4%, 12.2%, and 14.0% in older patients following lobectomy or pneumonectomy. Auricular fibrillation is also an uncommon complication following surgery for congenital cardiac lesions.

Patients with mitral stenosis who are most likely to develop postoperative atrial fibrillation appear to be those who also would have been most likely to fibrillate in the natural course of their disease. The three most common factors observed in this study that appear to increase the possibility of fibrillation are (1) increasing age, (2) a previous history of paroxysmal atrial fibrillation, and (3) the presence of associated mitral insufficiency.

The mechanism by which surgery initiates atrial fibrillation in such a setting is unknown. The following factors may be important and worthy of discussion:

1. Immediate effect of surgery
2. Activation of rheumatic carditis by surgery
3. Traumatic pericarditis
4. Increased left atrial pressure
5. Postoperative alterations in serum or intracellular electrolytes

The data obtained in this study are not sufficient to indicate the probable mechanism by which surgery initiates atrial fibrillation in susceptible patients. The mechanism appears most effective on the second postoperative day and its effect has subsided by the seventh postoperative day. This suggests that it is related to the total physiologic response of the body to surgery and not directly to the trauma of the operative procedure.

Atrial fibrillation appeared following mitral valvulotomy in 47% of 77 patients who had a normal sinus rhythm prior to surgery. The onset of postoperative atrial fibrillation was commoner in older patients, in those who had had prior episodes of atrial fibrillation, and in those who had some degree of associated mitral insufficiency. Fibrillation appeared most frequently on the second postoperative day and rarely on the day of surgery. Spontaneous resumption of sinus rhythm occurred in 10 patients; quinidine restored sinus rhythm in 16 patients leaving 10 who had persistent postoperative atrial fibrillation. The mechanisms responsible for the onset of atrial fibrillation are unknown, but the arrhythmia occurred at the time when postoperative alterations of body fluids and electrolytes were maximal. However, a decrease in intracellular potassium is probably not the cause. Because the ventricular rate is high in patients not receiving digitalis and because additional digitalis was needed to slow the ventricular rate of most patients who developed postoperative atrial fibrillation, all patients should probably be fully digitalized prior to valvulotomy. Because spontaneous resumption of sinus rhythm occurs in many patients, quinidine may be withheld until the seventh postoperative day. Also, it may be more effective at that time because the factors responsible for the onset of atrial fibrillation will by then have apparently diminished. (Heinz, R., Hultgren, H., Atrial Fibrillation Following Mitral Valvulotomy: Arch. Int. Med., 99: 896-903, June 1957)

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Postcholecystectomy Syndrome

The term, postcholecystectomy syndrome, has been used extensively to designate the symptoms suffered by patients after removal of the gallbladder. This phrase, although alluring, is not a good one and should be abandoned. It oversimplifies a complex subject and is also inaccurate because it suggests that all symptoms occurring after cholecystectomy have a common cause—the extirpation of the gallbladder. Although many patients do have symptoms after cholecystectomy, these symptoms do not constitute a syndrome of uniform pattern and etiology. On the contrary, postcholecystectomy symptoms arise as a result of a variety of causes. Only a full understanding of these causes can enable the physician to treat such symptoms and—what is more important—to prevent them.

In general, postcholecystectomy symptoms are of two major types: (1) those due to conditions existing prior to the operation and persisting following the operation; and (2) those due to conditions produced by the operation. These two groups may be subdivided as follows:

Causes of Postcholecystectomy Symptoms

1. Persistence of conditions existing prior to cholecystectomy

- a. Incorrect preoperative diagnosis
 - b. Continuing pancreatic disease
 - c. Continuing hepatic disease
 - d. Residual common-duct stones
2. Development of symptoms following cholecystectomy
 - a. Common-duct injury and stricture
 - b. Disease of cystic-duct remnant
 - c. Postoperative adhesions
 - d. Motor disturbances of the common duct and its sphincter (biliary dyssynergia)

With the possible exception of biliary dyssynergia, it would appear that these causes of postcholecystectomy symptoms represent either incorrect or incomplete diagnostic evaluation of the patient's problems prior to operation or technical errors at operation.

The symptoms of which a patient complains after cholecystectomy are to a large degree a measure of the medical care that he has had. They reflect, first of all, the diagnostic skill of the internist. Many of these symptoms are unrelated to the gallbladder and can be prevented only by careful and thorough investigation of the patient prior to operation so that every possible cause for abdominal distress will receive careful consideration. This is necessary even in those instances in which gallstones are easily demonstrated and typical biliary symptoms have occurred.

The surgeon who undertakes a biliary tract operation must have a high order of skill and judgment. These are necessary if residual common-duct stones and common-duct injuries are to be reduced to an absolute minimum. The diagnosis and treatment of cholecystitis and cholelithiasis should not be looked upon as relatively simple medical and surgical problems. This is certainly not the case. Only by means of the most competent care can the patient with gallbladder disease receive satisfactory therapy and avoid the persistence of preoperative symptoms or the development of new symptoms after the gallbladder has been removed. (Tumen, H. J., What Is the Postcholecystectomy Syndrome? - Am. J. Digest. Dis., 2: 289-299, June 1957)

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Multiple Myeloma

Multiple myeloma—once considered an extremely rare disease—has been diagnosed with increasing frequency during the last decade. Whether this has been due to an actual increased incidence or to improved clinical and laboratory recognition is not known. Usually the diagnosis of multiple myeloma is not difficult, but the disease may be at times an obscure and

insidious one. Although inevitably fatal, in some cases multiple myeloma may pursue a prolonged and chronic course and in even the more malignant forms of the disease, chemotherapy and other measures may afford some relief.

Multiple myeloma is reported to be more common in males than in females. This was true in the present series where the ratio was 1.6:1. Characteristically, the disease occurs in older age groups and is rarely encountered in patients under 30 years.

Pain is one of the most outstanding features of multiple myeloma. It may be classified into three general categories: the boring pain of an expanding lesion in the marrow cavity, the aching pain due to nerve root compression, and the acute stabbing pain associated with pathologic fractures. Pain is usually severe, but it may vary greatly in intensity and at times may spontaneously disappear.

Early in the disease, the patient may appear to be in good nutrition. However, as the disease progresses, profound weight loss and cachexia often develop, simulating other neoplastic conditions.

Anorexia, nausea, and vomiting commonly occurred in these patients prior to any therapy. Although more marked in azotemic individuals, the complaints were not necessarily related to renal disease. In spite of the frequency of these complaints, myelomatous lesions were seldom found in the gastrointestinal tract at autopsy.

Involvement of the central nervous system is not uncommon in myeloma and may result from (1) cord compression due to extramedullary tumor or collapsed vertebra; (2) perineural myelomatous invasion (plasma cytoma); (3) peripheral neuritis in which there is no apparent invasion of the central nervous system or peripheral nerve with tumor.

Experience with 57 cases of multiple myeloma over the last 9 years confirms the fact that this is not an extremely rare disease. The diagnosis is usually not difficult; the presence of pain, anemia, and weight loss in an older person, especially if accompanied by unexplained albuminuria, should arouse suspicion of this diagnosis. Physical findings are usually not helpful except for the rare occurrence of palpable tumor masses and the diagnosis usually depends on laboratory assistance. While rouleau formation, rapid sedimentation rate, and elevated serum globulin are highly suggestive, the presence of myeloma cells in bone marrow aspirate, Bence Jones protein in the urine, and the characteristic serum and urine electrophoretic patterns is of special diagnostic significance. It has been pointed out that x-ray evidence of bony abnormalities was present in a high percentage of these cases and that the presence of osteolytic lesions and pathologic fractures is of particular importance.

At the present time, there is no effective therapy for multiple myeloma. Cortisone or ACTH employed in 16 cases has not been helpful. Local intense x-ray therapy to sites of pathologic fracture resulted in relief of pain

and healing of fracture in two cases. Urethane has been used extensively in this series, and approximately 20% of the patients had some benefit from this drug. However, the survival time in this series does not appear to be increased by the use of urethane. It should be noted, however, that four patients who received long-term urethane therapy have apparently undergone prolonged remissions. While it is not certain that this was a direct result of urethane therapy, nevertheless, patients with multiple myeloma should be given an adequate trial with this drug. (Kenny, J. J., Moloney, W. C., Multiple Myeloma - Diagnosis and Management in a Series of 57 Cases: *Ann. Int. Med.*, 46: 1079-1089, June 1957)

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Spine Fusion in Young Children

When posterior spine fusion is performed in the young child, the question often is raised as to what happens to the growth of the fused vertebrae. Do the vertebral bodies increase in height? Does the fusion plate or graft grow? or, Is an imbalance of growth produced which eventually results in lordotic deformity?

In order to answer these questions in man, a clinical and roentgenographic study was made of the growth effects of spine fusion in fifteen patients who had been operated upon in early childhood and who had been followed well into adolescence or adult life. In these cases, early as well as end-result roentgenograms were available for measurements of the fused and contiguous unfused areas.

The operations were done at the New York Orthopedic Hospital, for tuberculosis; a Hibbs type of fusion was performed in each. At that time, in order to be certain of immobilization of the entire area of disease, it was customary to include in the fusion at least two normal vertebrae above and below the diseased vertebrae as seen roentgenographically. This fact made it possible not only to study the growth effects of fusion upon diseased segments, but also upon normal vertebrae.

The fusion areas in these patients involved the following regions of the spine: thoracic in seven, thoracolumbar in five, and lumbar in three. Tuberculosis involved two vertebrae in five patients, three in five, four in four, and five vertebrae in one. The length of the fusion area ranged from twelve vertebrae in one patient, nine in three, eight in three, seven in four, six in three, to five in one patient.

The degree of kyphosis varied from minimal in two patients to moderate or moderately severe in the rest. Six patients were boys and ten were girls. The youngest age at follow-up examination was 15 years and the oldest was 35, the average being 24 years. The shortest postoperative period of follow-up was 12 years and the longest was 31 years, the average being 21 years.

In all patients, fusion was successful and the disease healed; no essential increase in deformity occurred in any of the patients after the first 12 or 18 months following operation. For this reason, early post-operative rather than preoperative roentgenograms were measured. In most patients with tuberculosis, some increase in kyphosis was the rule during the early postoperative period.

The measurements expressed in comparative percentage change revealed that in these patients growth continued in the fused area, but to a lesser degree than in the contiguous normal and unfused vertebrae. Retardation of growth occurred in the vertebral bodies and to a somewhat greater degree in the posterior elements; this took place in both the old diseased areas and in the normal portions included in the fusion. Considerable individual variation of growth occurred even in those patients who were of similar age when operated upon; but, as was to be expected, the total amount of growth was greater in those who were younger at the time of operation.

Data obtained in these fifteen patients when related to the calculated growth in the different presacral regions of the spine at one and five years of age would indicate that, on the average, fusion at an early age will not diminish ultimate stature to any marked degree as growth in fused normal segments was only 23% less than in adjacent normal unfused vertebrae. However, when the factors of vertebral-body destruction from disease and consequent inhibition or cessation of growth were present in addition, the average loss of growth was greater—37%. This has been borne out clinically because these children have not developed into unduly short persons over and above what could have been expected from the ravages of the disease itself. This confirms the conviction that in tuberculosis fusion should be done early before major vertebral destruction and deformity have occurred.

Because growth of the posterior elements of fused normal vertebrae averaged only 13% less than that in adjacent normal segments, it would seem that there would be little prospect of producing significant lordotic deformity by fusion in childhood; or conversely, little hope of achieving by this means any major correction in dorsal round-back, unless the fusion were performed at a very early age and over an extensive area. (Hallock, H., Francis, K. C., Jones, M. B., Spine Fusion in Young Children - A Long-term End-Result Study with Particular Reference to Growth Effects: J. Bone & Joint Surg., 39-A: 481-491, June 1957)

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Please forward requests for Change of Address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Reporting Circumstances or Occurrence
for Injuries and Poisonings

Each month, it is necessary to return many NavMed-F cards because submitting activities have either neglected to report circumstances of occurrence for injuries and poisonings or have given insufficient data to allow proper classification by the Bureau.

During the past several years, there has been a continual rise in interest throughout the Navy in the circumstances of occurrence of injuries. At the present time, factual data is of great value in studies for the prevention of accidents and the data furnished on the NavMed-F is in constant demand.

Circumstance of occurrence for injuries other than those caused by motor vehicle accidents can usually be covered by a statement which tells where and how the accident occurred and what caused it. For example:

1. Patient aboard ship was burned when cutting torch spark ignited oily rags.
2. Gangplank of ship gave way and patient fell to dock 30 feet below.
3. Patient sprained back by jumping from flight deck to catwalk of aircraft carrier.

Injuries caused by motor vehicle and motorcycle accidents in particular require more detail for coding than do other injuries. Usually, by answering the following questions in the statement of circumstance the injury can be properly classified.

1. Premises - Where did the accident occur?
 - a. On a public highway
 - b. In a driveway
 - c. In a parking lot
 - d. At an airfield
2. Agency of injury - What type of vehicle (or vehicles) involved?
 - a. Private auto
 - b. Private motorcycle
 - c. Government jeep, command car, halftrack, tractor, et cetera
 - d. Train, bus, et cetera
3. Accident type - How did the accident happen?
 - a. Alighting from, falling from
 - b. Hit by
 - c. Ran off road
 - d. In collision with:
 - (1) Animal
 - (2) Another motor vehicle (what kind)

(3) Train

(4) Et cetera

e. Was the patient an occupant or nonoccupant?

Examples:

1. Patient was a passenger in a private auto which struck a cement abutment on a public highway and overturned.
2. Patient was driving a government jeep at the naval station and struck a parked private vehicle.
3. Patient fell when alighting from a civilian bus in the bus terminal.

Statements such as these allow classification of the accident which caused the injury while a statement such as, "Patient was a passenger in the back seat of a vehicle which was involved in an accident," does not give any information by which the accident can be classified.

Injuries caused by aircraft accidents should also be covered by a detailed statement. Answering the following questions usually gives all required information:

1. Military or commercial plane?
2. How did the accident occur? (Landing, taking off, collision with?)
3. Where did the accident occur? (In the air, on the airfield, or on a carrier?)
4. If on the ground, was the person injured an occupant of the plane or a nonoccupant?

Examples:

1. Patient was injured while a passenger of a military aircraft which crash-landed in a cornfield.
2. Patient (nonoccupant) was burned when attempting to rescue pilot of a military aircraft which had crashed on flight deck of carrier.

Poisonings are classified according to toxic substance.

Example: Patient poisoned by carbon monoxide fumes of gasoline engine.

When completing a statement of circumstances for injuries reported on the NavMed-F, give as complete a picture as possible using the questions in paragraphs above as a guide. By doing this, activities will maintain a better report record for themselves and will save correspondence from the Bureau. (MedStatDiv, BuMed)

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Mutual Assistance in Training

Throughout the history of the United States, evidence of cooperative assistance is found especially in times of crisis, between this country and allied countries or those having common objectives. However, vast long

range programs of assistance, particularly of a military nature, during peace time are new.

Today, military assistance and foreign aid are terms that cover a multitude of activities established since World War II. This article describes and illustrates military aid that is a part of the United States' support of foreign naval training programs. Almost any officer or man in the U. S. Navy can be called on at some time to assist in the training of other navies.

Under the Mutual Security Act (MSA) of 1951, as amended, the policy of supporting an efficient training program in each of the member countries is deemed of mutual benefit; and the establishment of such programs consistent with the treaties signed between the United States and the individual countries is to be promoted.

To carry out the functions of MSA, the Mutual Assistance Program (MAP) was established and that part dealing with military assistance was assigned to the Secretary of Defense. Within the Department of Defense, each service contributes to, and manages, that part common to its basic mission. Within the Navy Department, the Chief of Naval Operations administers the foreign aid program with technical assistance and administrative support provided by the entire naval establishment.

Technical assistance and guidance based upon experience gained in U. S. Navy training is provided both the Chief of Naval Operations and the Chief Navy Section MAAG by the Director of Training, Chief of Naval Personnel. He is also responsible for the procurement and delivery of all training equipments and aids required to support foreign training under the MAP.

U. S. Military Assistance Advisory Groups (MAAGs) and Joint U. S. Military Aid Groups (JUSMAGs) have been set up to administer the program in 42 countries with whom the United States has mutual assistance treaties.

Because much of the training deals with the technical know-how needed to operate and maintain modern ships, equipment, and establishments which the United States has provided to the member navies, this support and assistance are necessary and welcomed. The requirements vary. Under-developed countries that have newly acquired navies and few technically trained people present a problem different from countries with a long tradition of sea power and technological development.

The Chief, Navy Section MAAG, relies upon the established and proven U. S. Navy training programs. The Chief, Navy Section, MAAG, programs and arranges for the delivery of U. S. Navy training equipment and aids. These may range from a simple chart or publication to a complicated tactical trainer costing hundreds of thousands of dollars. Mobile training units that consist of U. S. Navy personnel may be assigned to a foreign navy to conduct intensive instruction under the program or, where necessary, civilian technical representatives may be made available.

Another method is to send foreign naval students to U. S. Navy training activities. These students return to their own countries to help establish local training programs or to act as instructors.

Each foreign navy has a different standard of operation, a different mission, and, often, different equipment; for these reasons, few U. S. Navy courses of instruction can be adopted in their entirety. However, revised versions adapted to local conditions are generally satisfactory.

Three examples of the success the U. S. Navy has had in carrying out its mission of training friendly navies are given in articles following this one. (Schertler, L. A., Naval Training Bulletin, May 1957)

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From the Note Book

1. Rear Admiral Refik Kuntol, Surgeon General of the Turkish Naval Forces, concluded a 30-day orientation visit to U. S. Naval Medical Department facilities on June 28, 1957. Admiral Kuntol showed particular interest in occupational therapy, physical therapy, psychiatry, psychological testing procedures and equipment, nutrition and nutritional studies, and other advances in medicine and in medical and surgical care. (TIO, BuMed)
2. The Residency Review Committee for Pediatrics, American Board of Pediatrics and the Council on Medical Education and Hospitals, has approved the residency program at the Naval Hospital, San Diego, Calif., for two years of training in Pediatrics. (TIO, BuMed)
3. On June 15, 1957, the staff of the Dental Department, Naval Station, Sangley Point, P. I., sponsored an all day professional program for 132 prominent members of the Philippine Dental Association. (TIO, BuMed)
4. Five hundred and eighty-seven awards for advanced nurse training have been made under a new Public Health Service program. The Service has just completed allocation of \$2 million appropriated by Congress last August to help overcome a serious shortage of nurses trained for teaching, supervisory, and administrative positions. This appropriation was for the first year of an authorized three-year program. The funds have been made available through 56 schools of nursing and public health to assist nurse trainees from every State. (PHS, HEW)
5. The sudden increase in deaths reported for the third week in June over the preceding week was associated with the heat wave blanketing much of the eastern half of the United States. Cities in the South Atlantic Division and in the Middle Atlantic Division reported the largest percentage increases.

The larger cities in these two divisions—New York, Baltimore, and Washington—reported increases in deaths of more than 20%. (Morbidity and Mortality Weekly Report, June 28, 1957, PHS, HEW)

6. Fourteen patients with pyrexia produced by fraud are reported. Twelve of these were women and five were nurses. Many had a history of similar previous episodes and several had other factitious diseases, such as hypoglycemia secondary to exogenous insulin, thyrotoxicosis due to consumption of large doses of the hormone, hematuria, purpura, or dermatitis. Methods of production and signs leading to the recognition of this syndrome are discussed. (Ann. Int. Med., June 1957; R.G. Petersdorf, M.D., I. L. Bennett, Jr., M.D.)

7. Every diabetic should know: (1) his diet plan and the basic principles of an exchange diet; (2) how to give insulin properly to himself; (3) how to test his urine; (4) how to take care of his feet; (5) what an insulin reaction is and what to do about it; and (6) what to do if he becomes acutely ill. (Postgrad. Med., June 1957; F.C. Goetz)

8. Electromyography is an important aid in modern neurosurgical orthopedic and neurological practice. With the development of a practical cathode ray oscilloscope electromyograph in which a needle electrode is used, the clinician has been presented with a reliable investigative technique which is sensitive far beyond his own powers of observation. (J. Bone & Joint Surg., June 1957; B. L. Crue, M.D., et al)

9. The indication for and interpretations of arteriograms in atherosclerosis obliterative and aneurysmal disease are presented in studies of 134 patients. (Arch. Surg., June 1957; B. Eiseman, M.D., H. U. Waggener, M.D.)

10. A review of 228 cases of bacteriologically proved brucellosis studied at the U S. Naval Medical Research Unit, Cairo, Egypt, is presented in Am. J. Med., June 1957; LCDR W.C.E. Pfischner, Jr., MC USN, et al)

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BUMED INSTRUCTION 6710.7D

19 June 1957

From: Chief, Bureau of Medicine and Surgery

To: Ships and Stations Having Medical Personnel

Subj: Smallpox vaccine and yellow fever vaccine; procurement of

Ref: (a) BuMedInst 6230.1, Subj: Immunization requirements and procedures

(b) Arts 22-22 and 22-25 ManMed

This instruction promulgates the procedures to be used in the procurement of smallpox and yellow fever vaccines. BuMed Inst. 6710.7C is canceled.

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BUMED INSTRUCTION 6320.4D

20 June 1957

From: Chief, Bureau of Medicine and Surgery
To: Naval Hospitals and Activities Having Station Hospitals or
Dispensaries with Authorized Beds

Subj: Hospitalization and subsistence rates, fiscal year 1958

Ref: (a) Art. 21-3, ManMed

This instruction promulgates information concerning the hospitalization and subsistence rates for fiscal year 1958, as it pertains to per diem rates to be collected locally for inpatient medical care and subsistence furnished certain supernumerary patients at naval medical treatment facilities, and meal rates to be collected locally for rations sold authorized personnel from naval hospital messes. BuMed Instruction 6320.4C is canceled.

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BUMED INSTRUCTION 6320.17A

26 June 1957

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical/Dental Personnel

Subj: Medical and Dental care for NATO personnel and their dependents

Ref: (a) BuMedInst 6320.4C, Subj: Hospitalization and subsistence
rates, fiscal year 1958 (NOTAL)
(b) SecNavInst 6320.8, Subj: Dependents' Medical Care

This instruction provides information on U. S. Navy medical and dental care authorized for subject personnel assigned to full-time duty with the North Atlantic Treaty Organization in the United States (the receiving state). BuMed Instruction 6320.17 is canceled.

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DENTAL**SECTION**

Dental Intern Program

The Navy Dental Intern Training Program is designed to provide special opportunities for advanced training in dental sciences and clinical practice to the Dental officer who is a recent dental school graduate. This training meets the standards for dental internships as outlined by the Council on Dental Education of the American Dental Association.

Applications are accepted from students in their senior year of dental school who are participants in the Ensign 1995 (Dental) Program. Applicants must be qualified for, and accept, appointments as Lieutenant (Junior Grade), Dental Corps, in the Regular Navy and must be at least 21 and under 32 years of age at the time of such acceptance. A minimum of 3 years service is required including the year of internship, or a total of 4 years if the intern has participated in the Senior Dental Student Program.

During the dental internship, the intern receives the benefits and pay of other Navy Dental officers with the exception of the inducement pay authorized by the Career Compensation Act of 1949, as amended. However, this inducement pay commences immediately upon completion of the internship.

Those selected as dental interns are ordered to active duty for rotating internships commencing each July at the following Naval Hospitals:

- U. S. Naval Hospital, Corona, Calif.
- U. S. Naval Hospital, Chelsea, Mass.
- U. S. Naval Hospital, Camp Pendleton, Calif.
- U. S. Naval Hospital, Great Lakes, Ill.
- U. S. Naval Hospital, Oakland, Calif.
- U. S. Naval Hospital, Philadelphia, Penn.
- U. S. Naval Hospital, Portsmouth, Va.
- U. S. Naval Hospital, San Diego, Calif.
- U. S. Naval Hospital, St. Albans, Long Island, N. Y.

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Representatives to Rome Congress

Dr. Thomas P. Fox of Philadelphia will represent the Department of Defense at the 12th International Dental Congress of the Federation Dentaire Internationale to be held in Rome, September 7 - 14, 1957. Dr. Fox is Chairman of the Defense Department's Dental Advisory Committee and a member of its Civilian Health and Medical Advisory Council. Representing the Armed Forces at the F.D.I. meeting will be Rear Admiral Ralph W. Malone, Assistant Chief, Bureau of Medicine and Surgery, for Dentistry, Major General James M. Epperly, Chief of the Army Dental Corps; and Brigadier General James S. Cathroe, Deputy Assistant for Air Force Dental Services.

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Captain Frechette Dental Advisory Committee Member

Captain Arthur R. Frechette DC USN, Head of the Professional Branch, Dental Division, Bureau of Medicine and Surgery, was named a member of the Defense Department's Dental Advisory Committee which was organized recently to study the dental care aspects of the Dependents' Medical Care program and to recommend appropriate changes.

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Board Certifications

As of 1 July 1957, forty-six Navy Dental officers are on active duty who have been certified by dental specialty boards.

| <u>Specialty</u> | <u>Number Certified</u> |
|----------------------|-------------------------|
| Oral Surgery | 14 |
| Prosthodontics | 26 |
| Periodontics | 3 |
| Oral Pathology | 2 |
| Pedodontics | 1 |

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Retirement

Captain Louis D. Mitchell, Jr., DC USN, was retired on July 1 1957, after serving 30 years of active service. Captain Mitchell will be associated with the faculty of the School of Dentistry, Medical College of Virginia.



RESERVE SECTION

Involuntary Call of Ready Reservists

BuPers Instruction 1001.15A promulgates principles for establishing priorities for involuntary call to active duty of individual members of the Ready Reserve of the Navy either in time of war or national emergency declared by the Congress or proclaimed by the President, or when otherwise authorized by law. Accordingly, pertinent parts of this directive are published for the information and guidance of all inactive Reservists of the Navy's Medical Department.

Policy. Liability for call to active duty during any period of mobilization is determined by the Ready or Standby status of Reservists and is not increased because of drill participation of an individual. During any partial mobilization which requires the involuntary ordering to active duty of Naval Reservists, it shall be the policy to maintain the integrity of the drilling units so as to continue the procurement, basic training, and advanced training of Reserve personnel; and to preserve the effectiveness of units designated for immediate mobilization upon the outbreak of hostilities or a full-scale emergency.

Considerations. Whenever the strength of the Ready Reserve exceeds the particular personnel requirements during a partial mobilization, the following principles shall be considered:

1. The integrity of the drill pay organizations shall be maintained. Therefore, among Ready Reservists in an active status, those members serving under pay orders attached to a pay unit should be called last.
2. Volunteers for active duty should be accepted whenever possible from either the Ready, Standby, or Retired Reserve, provided they are in all respects eligible and that drill unit integrity will not be seriously impaired.
3. Insofar as military requirements permit, involuntary call to active duty among Ready Reservists should be in inverse order of the following categories:
 - (a) Those who qualify for both (b) and (c) below.
 - (b) Have served on active duty for a minimum period of 12 months or more between 7 December 1941 and 2 September 1945 in the Army, Navy, Marine Corps, Air Force, Coast Guard, Public Health Service; or a

minimum period of 12 months or more between 1 September 1939 and 2 September 1945 in the Armed Forces of any country allied with the United States in World War II.

(c) Have served on active duty for a period of 17 months or more between 25 June 1950 and 31 January 1955 in the Army, Navy, Air Force, Marine Corps, Coast Guard, or Public Health Service, or have earned eligibility for the Korean Service Medal with at least one engagement star.

(d) Those who do not qualify for (a), (b), or (c) above, but who have served on active duty, selecting when possible those with the least amount of active duty first.

(e) Not in any of the above.

4. Quotas allocated for ordering Ready Reservists to active duty shall include specific instructions regarding the ordering of Waves whether voluntary or involuntary. Therefore, Waves may be ordered to active duty only to fill quotas as specifically designated to be filled by Waves.

5. Ready Reservists currently attending an accredited college or high school for a normal full time course of instruction should be deferred from reporting for active duty until such time as they cease to pursue such course satisfactorily, graduate from high school, complete the current college year, or attain age of 20 years, whichever occurs first. Such deferments may be terminated at any time when other overriding military requirements dictate.

6. Ready Reservists selected for, or enrolled in, programs, the successful completion of which normally includes commissioning in the Naval Service, shall not be ordered to active duty.

7. BuPers Instructions 1001.6A and 1821.1A permit transfer to the Standby Reserve for reasons of extreme personal or community hardship, critical civilian occupations, or student or apprentice status. Personnel who have initiated requests for transfer to the Standby Reserve prior to the effective date of the proclamation of national emergency and whose requests are still pending shall not be called to active duty prior to a final determination of their Ready status.

Note: Inasmuch as Ensign 1995 (Medical) USNR officers in good standing are in a deferred status, they are not affected by the provisions of this directive.

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Relocation of Naval Correspondence Course Center

BuPers Notice 1500 of 28 May 1957 announces that the Navy's Correspondence Course Center, previously located at Building RF U. S. Naval Base, Brooklyn 1, N. Y., has been changed during the month of June and that it will

be in a reduced status of operation during June and July. During this period correspondence with the Center should be kept to a minimum. The new address of the Center is:

U. S. Naval Correspondence Course Center
Naval Supply Depot
Scotia 2, N. Y.

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Increased Participation in Dental Reserve Training

Participation in Navy Dental Reserve training has increased markedly during the past year. In addition to increased interest in the Ensign Program in dental schools, there has been greater participation by the more senior Reserves. Comparison between 1956 and 1957 shows an increase of approximately 10% in personnel participating.

Non-Pay Dental Companies. During fiscal year 1957, the number of these companies increased from 77 to 79 and their membership increased from 1365 to 1447. The location, number, and membership of non-pay dental companies are as follows:

| <u>Naval District</u> | <u>Fiscal Year 1956</u> | | <u>Fiscal Year 1957</u> | |
|---------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|
| | <u>Number of Companies</u> | <u>Members in Companies</u> | <u>Number of Companies</u> | <u>Members in Companies</u> |
| 1 | 3 | 52 | 4 | 87 |
| 3 | 7 | 112 | 7 | 118 |
| 4 | 11 | 340 | 11 | 345 |
| 5 | 2 | 35 | 4 | 90 |
| 6 | 10 | 139 | 11 | 163 |
| 8 | 4 | 66 | 4 | 88 |
| 9 | 23 | 300 | 23 | 301 |
| 11 | 6 | 116 | 6 | 111 |
| 12 | 7 | 105 | 7 | 113 |
| 13 | 2 | 30 | 2 | 31 |
| PRNC | 2 | 70 | - | - |
| <u>Totals</u> | <u>77</u> | <u>1365</u> | <u>79</u> | <u>1447</u> |

Training Other than Non-Pay Dental Companies. During the first eleven months of fiscal year 1957, Navy Reserve Dental officers participated in training in the following methods and numbers:

| | FY 56 | FY 57 |
|--|-------------|-------------|
| Associated with pay units (pay status) | 36 | 19 |
| Associated with pay units (non-pay status) | 22 | 36 |
| Appropriate duty (pay status) | 379 | 356 |
| Appropriate duty (non-pay status) | 178 | 191 |
| Active duty for training | 492 | 613 |
| <u>Totals</u> | <u>1107</u> | <u>1215</u> |

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Retirement Points for Attendance at Certain Approved Meetings

Reserve Dental officers of the Armed Forces will have an opportunity to obtain three retirement credit points through attendance at the 98th annual scientific session of the American Dental Association in Miami, Fla, November 4 - 7, 1957. Under a plan devised by the Councils on Federal Dental Service and Scientific Session and the Dental Advisory Committee to the Department of Defense, credit points will be awarded for attending certain approved portions of the scientific program. In essence, the plan is as follows:

1. The Council on Scientific Session accepts suggestions from the Armed Forces for specific topics and essayists in the scientific program, just as it considers recommendations from other outside agencies.
2. After the scientific program has been adopted by the Council, copies will be sent to the Armed Forces so that they may specify which parts of the scientific session Reservists will be required to attend in order to obtain point credit.
3. The military will assign men to register Reservists at each designated program. The plan which has been approved by the Department of Defense, the Army, Navy, and Air Force, will be tried for a 3-year period beginning with the Miami meeting. (Journal ADA, June 1957)

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Captain Wunderlich Heads Naval Reserve Program

Captain Harry J. Wunderlich DC USNR relieved Captain Collister M. Wheeler DC USNR as Head of the Reserve Branch, Dental Division, 1 July 1957, when Captain Wheeler was placed on the retired list.

Captain Wunderlich is a graduate of St. Louis School of Dentistry. He has had extensive experience in Naval Dental Reserve matters during his 10 years of active duty with assignments as Naval Reserve Program Officer for the Eighth and Ninth Naval Districts.

Captain Wheeler Retires

Captain Collister M. Wheeler DC USNR was placed on the Naval Reserve retired list on July 1, 1957. Captain Wheeler graduated from North Pacific Dental College after serving as an Ensign during World War I. He conducted a civilian practice until commencing active duty as a dental officer during World War II. In addition to service on various duty stations, Captain Wheeler was assigned duty as Naval Reserve Dental Program Officer in the 12th and 13th Districts. He was appointed Head of the Dental Reserve Branch, Bureau of Medicine and Surgery on July 30, 1954 and served in this capacity until his retirement.

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PREVENTIVE MEDICINE SECTION

Prevention of Heat Casualties at a Marine Corps Recruit Depot

Recruits in summer training constitute the group in military populations with the highest rate of heat casualties. An unseasoned recruit undergoing strenuous training while exposed to summer heat will exhibit the usual signs of heat strain—high pulse rate, elevated body temperature, salt and water deficiency, and reduced capacity to work. If highly susceptible to heat, he may become a victim of heat exhaustion, heat cramps, or heat stroke.

In 1953, the Marine Corps Recruit Depot, Parris Island, S. C., adopted a program to prevent heat illness among recruits based on four main principles: (1) liberal water and salt intake; (2) rational clothing practices; (3) indoctrination of recruits and instructors in essential elements of hot weather hygiene; and (4) suspension of infantry drill when air temperature and humidity exceeded specified levels. This program succeeded in reversing a trend toward high rates of heat casualties noted in 1951 - 52, but success was achieved at considerable cost in daytime hours scheduled for drill periods.

In the summer of 1956, the training command at MCRD introduced two changes in existing hot weather training regulations as recommended in

reports of Bureau of Medicine and Surgery field studies conducted in 1954-1955: (1) The temperature humidity index of climatic heat previously used was replaced by a new index (Wet Bulb - Globe Temperature Index of Yaglou) based on readings of the wet bulb, dry bulb, and black globe thermometers. The last is a hollow 6-inch copper sphere painted matte black on the outside into which is inserted an ordinary thermometer. When exposed to sun and wind, the globe temperature rises above air temperature until a balance is reached between the heat gained by radiation and the heat lost by convection. The globe thermometer, therefore, integrates air temperature, thermal radiation, and air movement into a single reading. The wet bulb, together with the dry bulb reading, is a measure of humidity. The three readings are weighted and added together to give the WBGT Index which is determined using the following formula: .7 wet bulb + .2 globe + .1 dry bulb. The WBGT Index thus takes into account all physical factors in the thermal environment. (2) Two levels of climatic heat stress were established for suspending drill in hot weather: a lower level (WBGT 85 - 87.9) for recruits in the first 3 weeks of training and a higher level (WBGT 88 and above) which applies to all recruits alike.

In addition to these changes in hot weather regulations, the training program itself was modified in 1956 as follows:

1. A training period of 12 instead of 10 weeks
2. Special conditioning platoons for obese recruits
3. Greater emphasis on physical conditioning
4. A breaking-in period during the first week limiting the hours and intensity of drill and physical conditioning.

Therefore, comparison of 1956 with 1955 becomes of interest with respect to summer heat and incidence of heat casualties at MCRD. In both years, weather conditions were recorded hourly at the edge of the drill field. Cases of heat illness diagnosed by a medical officer at the dispensary were recorded on special forms.

Statistical evaluation of weather data indicates that the summer of 1956 was significantly hotter than 1955. There were, in fact, 44% more hours in the heat stress zone (WBGT 85 and over) in the summer of 1956 than in the corresponding period in 1955. There were, however, 30% fewer hours of training lost per man because the lower levels of heat stress applied only to recruits in early weeks of training. This group constitutes about one-third of the total recruit strength.

Despite the higher seasonal heat in 1956, the incidence rate of heat casualties was lower. The mean weekly rate from 1 June to 31 August was 4.67 per ten thousand recruits in 1956 compared with 12.4 in 1955. This difference is statistically significant ($p < .001$).

Major factors contributing to the lower incidence rate of heat casualties in 1956 as compared with 1955 despite higher levels of heat stress are: (1) use of the WBGT Index of climatic heat which takes into account

radiation and air movement as well as humidity and air temperature; (2) more gradual exposure of unseasoned recruits to work and to heat with special protection for obese recruits; (3) a better state of physical fitness in all recruits as a result of more intensive physical conditioning; and (4) a higher degree of heat acclimatization in the more seasoned recruits by permitting their exposure to higher levels of heat stress. (Based on paper by Minard, D., Belding, H. W., and Kingston, J. R., Prevention of Heat Casualties: Presented before the A. M. A. Section on Military Medicine, New York City, 4 June 1957)

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Crossing of the Curves - Tuberculosis and Lung Cancer

Among the serious chronic pulmonary diseases, cancer of the lung is challenging tuberculosis in frequency and has already surpassed it in mortality. Essentially the same case finding, diagnostic, and surgical machinery can be employed against the two diseases. Cancer of the lung is revealing an epidemiologic pattern which may prove helpful in the understanding and control of the disease. No obscure lung disease can be considered as satisfactorily assessed until cancer and tuberculosis have been excluded.

The decline in tuberculosis mortality and the sharp rise in lung cancer mortality have led to a Crossing of the Curves. By 1950, in California, primary cancer of the trachea, bronchus, and lung was causing more deaths than tuberculosis among persons 65 years of age and over. By 1954, lung cancer deaths exceeded deaths from all forms of tuberculosis in the whole population.

Since 1930, tuberculosis mortality has dropped to one-tenth of its rate at that time. The respiratory cancer rate has, meanwhile, more than trebled with lung cancer comprising an ever larger proportion of the total.

Two factors have contributed to the decline in tuberculosis mortality. First are the medical developments and, second, the general improvement in standard of living. Together they have accounted for a steady decline in tuberculosis mortality. The addition of antibiotics and other potent drugs to the therapeutic resources has accelerated the rate of decline. The annual incidence rate has likewise decreased, but at a less rapid rate. The tremendous expansion of x-ray survey programs has increased the proportion of known tuberculosis, but because in the United States there are still an estimated 150,000 unreported and largely undiagnosed and unsuspected persons with active tuberculosis diagnostic activities and propaganda for more frequent x-ray films must continue unabated.

A gradual change in the differential diagnostic problem is evident. In past years, tuberculosis was found more commonly on the chest film than

all other serious chronic lung conditions combined. Today, lung cancer and lung suppuration challenge tuberculosis in frequency.

Because so few patients with lung cancer survive, even with treatment, the age-adjusted mortality rate remains the best measure of the disease. This rate is still increasing rapidly. Improved methods of diagnosis account in part for the rise in lung cancer deaths. However, since 1940, the mortality rate for men in California has increased 147% while that for women has been only 29%.

Three factors have been suggested to account for the increase and present data indicate that each of the three plays a role in the development of lung cancer. Many studies have disclosed a greater frequency of cigarette smoking—especially heavy cigarette smoking—among patients with lung cancer as compared with controls. Several occupations have been incriminated, particularly those involving exposure to certain metallic substances or fumes. In this country, carcinogenic substances have been isolated from polluted city air.

DEATH RATES PER 100,000 POPULATION, CALIFORNIA

| | 1930 | 1954 |
|----------------------------|------|------|
| Tuberculosis, all forms | 99.1 | 9.8 |
| Tuberculosis, respiratory | 88.4 | 9.0 |
| Cancer, respiratory system | 5.2 | 17.9 |

In evaluating the carcinogenic effects of environmental agents, one must bear in mind the time factor. The evidence suggests that environmental factors lead to human cancer only after many years of exposure. Hence, the rise in lung cancer mortality during the period 1930-1960 may reflect environmental factors during the first half of this century. Likewise, the environmental changes during recent years—e. g., vast increases in cigarette smoking among women and among young people of both sexes, entry of hundreds of thousands of persons into such occupations as welding, the heavy air pollution of certain cities—may portend a continuing increase in lung cancer mortality during the latter half of this century.

The male predominates in mortality from both conditions. The ratio is about 3 to 1 in the case of tuberculosis and 5 to 1 in lung carcinoma.

Tuberculosis, formerly a disease of adolescents and young adults predominantly, has now become a disease of middle aged and older persons predominantly. Lung cancer, too, is a disease of the middle and later years.

Tuberculosis is especially prevalent in slum areas, among poorly nourished persons, and among those living in contact with infectious cases.

Lung carcinoma is more scattered in distribution; housing and nutritional factors seem to play little, if any, role.

Ordinarily, an x-ray film of the chest is the earliest method of detecting either disease. However, certain forms of tuberculosis and carcinoma cannot be easily differentiated on the film. In fact, the x-ray film usually cannot be considered definitively diagnostic unless supplemented by laboratory methods and histologic examination. In the case of tuberculosis, the demonstration of tubercle bacilli is definitive. In the case of carcinoma, biopsy or cytologic examination may give the answer. Every clinically silent lesion casting shadow on the chest x-ray film must have tuberculosis and carcinoma ruled out before any other diagnosis can safely be made. Resection of lung containing a small cancerous nodule in a person in apparently good health represents a triumph of preventive medicine.

The organization and technical machinery originally set up for tuberculosis can be, and is, being used increasingly to attack the problem of cancer of the lung. The same skills are necessary for diagnosis and treatment. As time goes on, the epidemiology of cancer of the lung will assume a larger importance, and this will concern all health departments.

The final conquest of tuberculosis depends upon preventing the transmission of infection from one person to another. Elimination of slums, the examination of every contact of tuberculosis cases, the x-ray film examination of every hospital and prison admission and the isolation of infectious persons will cut so many chains of person-to-person infection that virtual disappearance of the disease may be hoped for.

The factor of resistance is a very important one in tuberculosis. Improvement in general health and lessened crowding make transmission less likely. A significant factor in tuberculosis control is alcoholism which reduces resistance and increases chances of transmission.

No dependable data are at hand regarding the role of smoking in tuberculosis. However, respiratory trauma which is inevitable in a coughing compulsive smoker probably decreases the ability of pulmonary tissue to defend itself against the tubercle bacillus. On the other hand, overwhelming epidemiological evidence now indicates that cigarette smoking is an important causative factor in lung cancer.

Further studies should be carried out. Even more needed is epidemiologic study of air pollution and occupations as causative factors in lung cancer. It is conceivable that cigarette smoking may have been the most important causative element in the increasing mortality from lung cancer up to the present time, but that other environmental factors may be active and become more so in the future. Laboratory studies should be carried out to isolate the specific substances in the environment and the mechanism of action. (Tuberculosis Abstracts, National Tuberculosis Association, XXX, June 1957; Kupka, E., Breslow, L., The Crossing of the Curves: Tuberculosis and Lung Cancer: Dis. Chest, XXXI: 23-34, January 1957)

Lights and Darks in the Tuberculosis Picture

That tuberculosis still presents a grave menace despite modern advances was stressed by the Director of the Rutland State Sanatorium in an address to the Essex County Health Association of Massachusetts at its annual meeting.

After commenting on the improved clinical picture in sanatoria through chemotherapy and the spectacular fall in the tuberculosis death rate, the speaker passed to the dark side. There are still 16,000 deaths each year in the United States—preventable deaths. Only 12% of patients discovered through case findings are still in the early stage; 87% of the patients entering sanatoria are already in a far-advanced stage of the disease.

The morbidity rates, instead of curving downward as the mortality rates are doing, are almost following a horizontal line. Indeed, in some places the line is rising. So, every year, some 80,000 new cases are reported. Why is the morbidity so high? There seem to be many reasons.

1. Better and more intensive case finding methods may bring forth more new cases, but this would not explain the whole situation.
2. The patients who would not have survived in the past are now living for years under drug therapy and mingling in the community.
3. Many tuberculous individuals are treated at home and never go to a sanatorium. They are likely to spread tuberculosis during the active phase of their disease.
4. It could also be that, in view of increasing longevity, people who might have died in their forties or fifties are still living and in their middle sixties when tuberculosis develops more readily because of a generally lowered resistance to all infections. This is particularly true of the homeless of whom there are many in that age group.

Education, not only of the public but also of the patient, the patient's family (in order to prevent contamination), the physician, and the nurse, was given first place in the control armamentarium. Because case finding is more difficult than ever, one must know where to look in order to find the last entrenchment of the tubercle bacillus, such as among hospital admissions, older men, transients, drifters, and alcoholics.

When dealing with communicable disease, it is impossible to remain at a standstill—there is either gain or loss. Research must continue relentlessly until eradication is an actual fact. Only then can tuberculosis be justifiably placed on the inactive shelf beside diphtheria and typhoid fever as a disease to refer to once in a while for historical purposes. (Lights and Darks in the Tuberculosis Picture—Sanatorium Head Urges Relentless Warfare: This Week in Public Health, Mass. Dept. Pub. Health, 6: 213-214, May 27, 1957)

The Cardiologist Enlists the Epidemiologist

Dr. Paul Dudley White, in Part 2 of the April 1957 issue of the American Journal of Public Health, discussed the current approach to knowledge of coronary heart disease. Cardiologists have enlisted the help of mathematics, physics, chemistry, engineering, biology, comparative anatomy, physiology, pathology, experimental researches on animals in the laboratory, the application of physical and engineering laws, including hydrodynamics, to the effect on delicate tissues like the intima of the coronary arteries and aorta and physiopathological effects of factors outside the artery walls and blood stream. Geneticists and biostatisticians must be included among the investigators.

Basic factors behind coronary heart disease are of very great importance. These include the possible influence of race; sure influence of heredity, sex, and age; and, quite likely, X factors that are basic, but which have not been thought of as yet. Since, at present, little or nothing can be done in the control of these factors, despite the possibility of future practical application of some eugenic principles, even more time should be spent in efforts to protect candidates for coronary heart disease by practical and sensible modifications of environmental factors and their ways of life.

The relationship of the ways of life to heart disease has come to be called epidemiological cardiovascular research. A good many internists who have been interested in the study of etiology of coronary heart disease, long before the professional epidemiologists themselves took up the cudgels, have asked for help in the solution of the problem through emphasis on the probable importance of environmental factors in the causation and aggravation of the disease. The day of united effort is now dawning and cardiologists must take advantage of the experience and skills of the professional epidemiologist while he, in turn, must learn about cardiovascular disease and get from the cardiologists their first hand experience with this malady.

In addition to Dr. White's article, this issue also contains several reports which constitute excellent examples of epidemiological approaches to the study of coronary heart disease. (White, P.D., The Cardiologist Enlists the Epidemiologist: Am. J. Pub. Health, Part 2, 47: 1-3, April 1957)

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Is There a Doctor in the Plant?

On the average, an injury occurs every 9 seconds. A piece of metal might strike the eye of a machinist who failed to put on safety goggles or perhaps dermatitis will appear on the ungloved hand of a worker who mixes solvents. Maybe the victim will be inhaling the crucial whiff of dust or gas that tells him for the first time that he really should have been wearing his

respirator mask all along. Loss of hearing suddenly may become apparent to a foundry worker who regards his ear plugs as "a nuisance."

Industrial health hazards are as old as industry, but little was done to prevent them until the turn of the century. Occupational medicine has become an integral part of industry. There are now 25,000 physicians doing such work, of whom 5000 are on full time mainly in large industries. Substantially, no inplant medical services are available in firms employing fewer than 100 persons each.

Current developments in the field are not enough; medical services are needed in industry as never before. The fundamental solution to this problem appears to be greater participation by the general practitioner toward the basic preventive health goal of occupational medicine. Most physicians in general practice have some direct or indirect responsibility for medical service in cases of occupational origin. The future might well see the bulk of small plant occupational health programs handled by private practitioners with industrial medical specialists serving primarily as consultants. For all foreseeable time, industry expects to rely upon the private practitioner to serve industry's work force.

The job is progressively becoming more complex. As the general tensions of life reach a higher pitch and as automation reduces the hazard of physical injury, the frontier of occupational medicine lies increasingly in the realm of the mind and in better understanding of human problems. A growing need for clearer channels of communication is also apparent, not only among all groups concerned with health and safety, but also with management and labor. (Special Reports, Is There a Doctor in the Plant?: J. A. M. A., 163: 1139-1141, March 30, 1957)

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Problems of Antibiotics in Milk

On September 10, 1956, a Medical Advisory Panel accepted the invitation of the Commissioner of the Food and Drug Administration to consider the public health problems involved by the presence of antibiotics in market milk. In addition to the panel, representatives of many official, voluntary, and industrial agencies attended. Following the all day session during which the problems involved were discussed thoroughly, it was apparent that the main health concern involved penicillin to the exclusion of the other antibiotics that are used in mastitis preparations. It was the consensus of the panel that antibiotics, such as the tetracyclines, bacitracin, polymyxin, and neomycin—all of which may be found in mastitis preparations—do not pose a public health problem even though they may find their way into market milk.

It was agreed that penicillin is a highly active antigenic substance which in the very small concentrations found in milk might well cause reactions

of varying intensity from mild transient to possibly serious ones in highly sensitive individuals. The latter individuals, constituting something less than 10% of the population (approximately 17 million persons), are obviously most concerned with this public health problem. Because scientific proof is essential, it was the consensus of the panel that further studies were necessary with highly sensitive human volunteers to determine whether the ingestion of milk containing those concentrations of penicillin now found in market milk would cause allergic manifestations. Two panel members, in collaboration with the Food and Drug Administration, agreed to carry out such studies.

Although it was recognized by the conference members that penicillin could be added illegally to milk as a means of lowering bacterial counts, it seemed obvious from the discussion that penicillin was reaching the milk supply primarily through the improper use of mastitis preparations for the treatment of infected dairy animals. Although the labeling of mastitis preparations carries a warning to the farmer that milk from treated cows should not be sold for human use for three days after the last treatment, it is his failure to follow these instructions in some cases that causes the major adulteration of the milk supply. Furthermore, this warning appears in the labeling, but not on the label of each preparation. It seems advisable, in order to carry the warning more directly to the user, that it be placed prominently on the label of each mastitis preparation container. Steps are now being taken to make the necessary amendments to the antibiotic regulations.

During the past few years, the Department of Agriculture has been concerned with the problem of antibiotics in milk because of the interference of these drugs with cheese-starter cultures. In their studies, they have been able to demonstrate that certain dyes incorporated in mastitis preparations will color the milk from such animals so that it is readily recognized as being from an infected animal. Considerably more work has to be done in this area. If a satisfactory dye is found, it may be quite advisable to require by regulation that it be added to all mastitis preparations so that for several milkings after treatment the milk will be distinctly colored and, therefore, unfit for use as market milk.

Quite likely, milk producers do not recognize the possible danger to the public health that is associated with the adulteration of market milk with antibiotics. It is likely also that the warning which now appears in the labeling of these preparations has not been brought forcibly home to milk producers. Actually, milk from infected cattle is adulterated per se because of its content of pus and bacteria and the milk shipped to the market too early after treatment of the cows with an antibiotic preparation is doubly damned because of the presence of both antibiotic and evidences of infection. It is quite possible that the public health problem involved here may be considerably reduced by a strong educational program directed to those who are

responsible for the production of market milk. The consensus of the Medical Advisory Panel was that an educational program of considerable magnitude may be helpful in at least partially alleviating the situation.

It should be emphasized that the problem of contamination with antibiotics in foods and particularly in milk is a small one compared to other current food safety problems which have arisen in large part as a result of technologic progress in food production, processing, and distribution; In the processing of food, preservatives, antioxidants, colors, bleaches, flavors, coating, drying agents, moistening agents, thickening agents, sequestering agents, "aging" agents, stabilizers, emulsifiers, neutralizers, acidifiers, and sweeteners are utilized. In production and processing of food, new equipment cleaners, sanitizers, lubricants, surfacing materials, and alloys composing the equipment itself may all contaminate the food processed. In distribution, food packages which incorporate new plastics, enamels, films, plasticizers, antioxidants, catalysts, and coatings are further potential sources of food adulteration.

These agents utilized in processing, production, and distribution of foods may be inherently toxic and may have an accumulative effect, and combinations of them may have synergistic toxic effects—in short, the problems involved with such agents are enormous. As noted above, the case of penicillin in milk is a minor problem by comparison. Penicillin is a relatively atoxic substance and may be taken by nonsensitive individuals in enormous concentrations. The problem with penicillin—it should be repeated—is related to a relatively small proportion of the population, namely, those unfortunate individuals who have become sensitized to the drug. Nevertheless, milk is consumed by the strong and the weak, the old and the young, the well and the sick, and the allergic and the nonallergic individual. Even though the adulteration of milk with penicillin may affect only a small percentage of the population, this percentage can represent several million people all of whom must and will be fully protected from adulterated food under the Food, Drug, and Cosmetic Act. (Welch, Henry, Ph.D., Problems of Antibiotics in Food as the Food and Drug Administration Sees Them: Am. J. Pub. Health, 47: 701-705, June 1957)

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Dishwashing Film

A new motion picture, How Clean Is Clean? shows how high levels of dish sanitation can be maintained by a combination of hot water at correct temperatures for washing and rinsing, plus proper use of dishwashing equipment, correct use of detergent, and careful storage. The film reportedly is directed at hotel and restaurant groups, public health officials, sanitation engineers, and equipment dealers in the volume feeding field.

It is sponsored by the National Sanitation Foundation and the Conference of Municipal Health Engineers.

Running 20 minutes, the film is 16-mm, in color, and with sound. Organizations may obtain it on a loan basis through the American Gas Association, 420 Lexington Ave., New York, N. Y., or the National Sanitation Foundation, School of Public Health, University of Michigan, Ann Arbor, Mich. (New Literature, Dishwashing Movie: Modern Sanitation, 9: 41, May 1957)

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Manual Artificial Respiration in the Sitting Posture

A new method of manual artificial respiration is described. It consists of alternate flexion of the upper part of the body against the knees of the patient and subsequent extension. Experimental trials on curarized patients showed that an effective exchange of air was produced by this method. The patient's position during the application of the method maintains a free airway and avoids aspiration. The method is very simple and can be learned in a few seconds. This method of artificial respiration is useful for patients who become apneic while sitting (e. g., in the dentist's chair) and where the patient cannot be laid down in an extended position. (Industrial Hygiene Digest, 21: 10, March 1957; Ruben H., Manual on Artificial Respiration in the Sitting Posture: Lancet, 272: 134-135, 19 January 1957)

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Are Seat Belts Good or Bad?

Traffic Safety, Volume 51, July 1957, a National Safety Council publication, contains a succinct question-and-answer presentation of the present status of automobile safety belts and of the American Safety Belt Institute that authorizes a seal of approval to makers of belts meeting performance standards set by the Society of Automotive Engineers. In a brief reading time, the accomplishments and limitations of these devices are clearly set forth. This material provides encouragement for persons planning for their driving safety and guidance for the procurement of proper devices.

There is general agreement that a seat belt prevents many injuries and reduces the severity of others by restraining the force of the forward motion. It makes many accidents survivable which probably would't be without a belt. Comparison studies indicated that belt users had less risk of injury—minor, moderate, or dangerous—than nonusers with the advantage ranging up to 60%.

The best seat belt is no better than its installation. Because installations must vary with the make and model of the car, it is best to follow exactly the specific instructions provided by the belt manufacturer.

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Control of Lead Exposure in Patent
Annealing and Galvanizing of Wire

A problem arising from expansion of plant facilities which caused an exposure to lead fumes and excessive heat in a previously satisfactorily controlled operation was detected through routine engineering and medical control programs.

Working conditions were improved by emphasizing unique double exhaust hoods over lead patenting furnaces and by the use of aluminum shielding to reduce the heat load. As a result, urine and blood lead levels of employees dropped from higher than occupational levels to occupational levels and there was an improvement in the general health of the workers along with an increase in the hemoglobin and red blood count. (Halperin, H. J., Reichenbach, G. S., Jr., Engineering and Medical Control of Lead Exposure in Patent Annealing and Galvanizing of Wire: Am. Indust. Hyg. A. Quart., 18: 55-58, March 1957)

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